

What Is Claimed Is:

- 1 ~~1.~~ A method for communicating, comprising the steps of:
- 2 (1) selecting a radio frequency band from the electromagnetic (EM)
- 3 spectrum as a band of interest;
- 4 (2) selecting a channel within said band of interest as a channel/band
- 5 combination;
- 6 (3) causing an input filter device to filter the EM spectrum thereby
- 7 passing said channel/band combination;
- 8 (4) down-converting said channel/band combination to create a down-
- 9 converted signal; and
- 10 (5) causing an output filter to filter said down-converted signal to
- 11 create a filtered down-converted signal.
- 1 2. The method of claim 1, wherein step (4) comprises:
- 2 (a) receiving said channel/band combination;
- 3 (b) aliasing said channel/band combination according to an aliasing
- 4 signal, said aliasing signal having an aliasing frequency, said aliasing frequency
- 5 being a function of a clock signal; and
- 6 (c) outputting a down-converted signal.
- 1 3. The method of claim 2, wherein said down-converted signal is an
- 2 intermediate frequency signal.

1 4. The method of claim 2, wherein said down-converted signal is a baseband
2 signal.

1 5. The method of claim 2, wherein said clock signal has a clock frequency,
2 the method further comprising the step of:

3 (6) adjusting the clock frequency for said channel/band combination so
4 that said aliasing frequency is suitable for down-converting said channel/band
5 combination.

1 6. The method of claim 1, further comprising the step of:

2 (6) decoding said filtered down-converted signal to create a decoded
3 down-converted signal.

1 7. A system for communicating, comprising:

2 a controller that operates under the direction of a user, and that issues a
3 first command signal and a second command signal;

4 a control signal generator to generate a control signal according to said
5 first command signal; and

6 a unified down-converting and filtering (UDF) module to filter and down-
7 convert one or more input signals based on said control signal and according to
8 said second command signal, said UDF to thereby output a channel filtered and
9 down-converted signal.

1 8. The system of claim 7, further comprising a decoder to generate a decoded
2 output signal from said channel filtered and down-converted signal.

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9. The system of claim 7, wherein said control signal generator is a voltage controlled oscillator.

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10. ~~The system of claim 7, wherein one of said one or more input signals is selected as a selected input signal and said UDF module comprises:~~

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(1) a frequency translator to under-sample said selected input signal to produce an input sample of a down-converted image of said selected input signal, and to delay said input sample; and

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(2) a filter, comprising:

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(a) at least a portion of said frequency translator;

(b) at least one delay module to delay instances of an output

signal; and

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(c) an adder to generate an instance of said output signal from at least one of said delayed input samples.

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11. The system of claim 10, wherein said frequency translator comprises a down-convert and delay module to under-sample said selected input signal according to said control signal, wherein a frequency of said control signal is equal to a frequency of said selected input signal plus or minus a frequency of said down-converted image, divided by n , where n represents a harmonic or sub-harmonic of said input signal.

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12. The system of claim 8, wherein said controller issues a third command signal, and wherein said decoder operates according to said third command signal.

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13. A method of communicating, comprising the steps of:

- 2 (1) specifying one or more radio frequency bands from the
3 electromagnetic spectrum as bands of interest;
- 4 (2) specifying one or more channels within each of said bands of
5 interest as channel/band combinations;
- 6 (3) selecting one of said channel/band combinations as a monitored
7 channel/band combination;
- 8 *BP* (4) causing an input filter to operate with said monitored channel/band
9 *cont* combination, and filtering an input signal using said input filter, to create a
10 filtered signal having a frequency within said monitored channel/band
11 combination;
- 12 (5) down-converting said filtered signal to create a down-converted
13 signal;
- 14 (6) causing an output filter to operate with said monitored
15 channel/band combination, and filtering said down-converted signal using said
16 output filter; and
- 17 (7) causing said output filter to generate a filtered down-converted
18 signal from said down-converted signal.

1 14. The method of claim 13, wherein step (5) comprises:

- 2 (a) receiving said filtered signal;
- 3 (b) aliasing said filtered signal according to an aliasing signal, said
4 aliasing signal having an aliasing frequency, said aliasing frequency being a
5 function of a clock signal; and
- 6 (c) outputting said down-converted signal.

1 15. The method of claim 14, wherein said clock signal has a clock frequency,
2 the method further comprising the step of:

3 (8) adjusting the clock frequency for said monitored channel/band
4 combination so that said aliasing frequency is suitable for down-converting said
5 channel/band combination.

1 16. The method of claim 13, further comprising the steps of:

2 (8) selecting a decoder to be a selected decoder, said selected decoder
3 being configured to operate with said monitored channel/band combination; and

4 (9) using said selected decoder to create a decoded down-converted
5 signal from said filtered down-converted signal.

1 17. The method of claim 13, further comprising the steps of:

2 (8) repeating steps (3) through (7).

1 18. The method of claim 13, wherein said down-converted signal is an
2 intermediate frequency signal.

1 19. The method of claim 16, wherein said down-converted signal is a
2 baseband signal.

1 20. A system for communicating, comprising:

2 an input filter module comprised of one or more input filters to filter one
3 or more input signals so as to generate one or more filtered input signals;

4 a universal frequency translator to down-convert at least one of said one or
5 more filtered input signals to generate a down-converted signal; and

6 an output filter module comprised of one or more output filters to filter
7 said down-converted signal.

1 21. The system of claim 20, further comprising a control signal generator that
2 outputs a control signal, wherein said universal frequency translator operates
3 according to said control signal.

1 22. The system of claim 21, wherein said control signal generator is a voltage
2 controlled oscillator.

1 23. The system of claim 21, further comprising a decoder module comprised
2 of one or more decoders, wherein said decoder module decodes said filtered
3 down-converted signal to generate a decoded output signal

1 24. The system of claim 23, further comprising a controller that operates under
2 the direction of a user, said controller to issue at least a first command signal, a
3 second command signal, a third command signal, a fourth command signal, and a
4 fifth command signal, wherein

5 said input filter module operates according to said first command signal,

6 said universal frequency translator operates according to said second
7 command signal,

8 said control signal generator operates according to said third command
9 signal,

